[1] Title of the proposed observation.
Multi-wavelength observations to study the energy propagation of waves and flares from the photosphere to corona

[2] Short statement describing the observation, and scientific justification.
Small-scale transient phenomena in solar atmosphere, including microflares, nanoflares, jets and type-II spicules, are believed to be influential for channelling energy into the corona. While microflares and nanoflares display energetics several orders-of-magnitude lower than large-scale flare events, their higher occurrence rates may mean their overall contribution to atmospheric heating cannot be neglected. Furthermore, waves are also of significant interest. Oscillatory motions of more acoustic origin often evolve into shocks in the lower atmosphere, providing localised energy dissipation. Contrarily, less easily dissipated waves (such as trapped magneto-acoustic and Alfven modes) can often propagate deep into the corona, thus providing wave energy to these regions of the solar atmosphere. Recently, Hinode and IRIS have been influential when documenting these dynamic phenomena. However, we still require better atmospheric coverage (both in time, space and formation height) to accurately constrain the distinct contributions each of these mechanisms play in the overall coronal energy budget.

We intend to examine the available energy budgets and timescales of reconnection- and wave-related energy propagation. Through a combination of high temporal, spatial and spectral resolution imaging and spectroscopy, from a range of satellite and ground-based telescopes, we propose to examine these events through continual coverage spanning the IR to X-ray portions of the EM spectrum. We will focus our attention on solar active regions where the radiative losses are largest (i.e., requiring more energy input) and atmospheric magnetism is most complex. Complementary data sequences from the Dunn Solar Telescope (see detailed Appendix information below), alongside joint Hinode and IRIS observations, will allow quantitative measurements of the dynamic phenomena, including densities, temperatures, line-of-sight (Doppler) velocities, non-thermal line widths and spectral line asymmetries, to be studied and documented over a vast range of atmospheric heights spanning the photosphere to outer corona. The simultaneous nature of the observations will allow temporal and spatial correlations (through techniques such as phase analysis) to be undertaken, particularly between the chromosphere and lower corona where strong interactions are believed to take place.

[3] Point of contact. Name and email address.

<<QUB>>
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[4] Time period of proposed observations, if required.
<<Start and end dates>>
9-15 January 2015

<<Minimum number of observation days>>
4 days in total

<<Continuity of observations>>
We request continuous observations for about 3 hours each day.

[5] Time window in day, if required.
<<Minimum duration>>
Desirable duration is about 3 hours per day
(14:30 - 17:30 UT)
Minimum duration is 1 hour depending on the target

<<Allowability of short interruptions>>
for ten-minute synoptics

[6] Target of interest:

Specific observation targets will be proposed (in advance) daily from the following
themes:

Active Region on disk
(including sunspots, plage, small-scale chromospheric brightenings)

[7] Required Hinode instruments, and priority of observables.

<<request to SOT>>

BFI (CaII H)	56" x 112"	/60sec	
BFI (G-Band)	56" x 112"	/60sec	
NFI (NaI IV)	82" x 82"	/60sec	
SP (fast map)	41" x 82"	(15min)	once/hr

<<request to EIS>>
running the following study while whole of the observation time.

STUDY ID: 518 HH_Flare_raster_v6 (2"slit, 19(3")step, 9s exp, 152" x 59")

<<request to XRT>>
512"x512"/30sec
<<request to IRIS>>
slit jaw : 1330 A, 1400 A, 2796 A
spectra : Sit-and-stare, slit across an active region and orientated in N-S direction to provide better correlation with Hinode/EIS spectra.

[8] Appendix: Observations at the Dunn Solar Telescope (Sacramento Peak, NM, USA; proposal in preparation)

The Dunn Solar Telescope at Sacramento Peak Observatory will provide high temporal, spatial and spectral information, including the continuum around the Balmer jump (3500 Angstrom and 4170 Angstrom filtergrams), Ca II K, G-band, Mg I b2, H-alpha, Ca II 8542 and He D3 with a field-of-view of up to 190” x 190” and a temporal resolution of 60 FPS.

ROSA	:	3501 A continuum	0.180”/pix	180” x 180”	30fps
		4170 A continuum	0.180”/pix	180” x 180”	30fps
		G-band	0.180”/pix	180” x 180”	30fps
		Ca II K core	0.180”/pix	180” x 180”	30fps
		Mg I b2 core	0.180”/pix	180” x 180”	30fps
QUB sCMOS	:	Ha core(0.25 A)	0.109”/pix	180” x 180"	60fps
IBIS	:	Ca II 8542 A	0.097”/pix	97” x 97”	5.4s scan cadence
		whitelight(8280A)	0.097”/pix	97” x 97”	5fps
FIRS	:				